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ABSTRACT

Cabletelevision (CATV), if properly applied, can increase and enhance educational opportunities. FCC regulations allow free educational access to cable television. CATV has the capacity to dedicate more than one channel to education; this can provide a greater variety of educational programing with repetition throughout the day. A second educational channel could be used to handle educational administrative matters. Indeed, CATV can link the school with homes to deliver information to home-bound students or to adult learners. Moreover, CATV systems can link schools to public agencies and institutions as well as the home. However, despite the fact that educators have made little use of CATV, the "Vincennes Project" together with Grand Junction, Colorado, and Oregon State University provide three examples of innovative and successful uses made of CATV by educators. Finally, "leased access channels," and the "two-way" interactive CATV will enhance the potential of educational uses of cable television. (WCM)

EDUCATIONAL USES OF CABLE TELEVISION

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Martin Mayer has stated, "We educate for the purpose of helping the learner to get on in the world."[1] But there is considerable evidence that education inside the classroom lags far behind events outside the classroom. For example, a student who receives almost daily reports on the status of Skylab or repeated doses of "Star Trek" may be much less interested in a lecture on Copernicus. The result is an educational system that is not reaching its goal.

One of the earliest attempts at bridging the gap between experience inside and outside the classroom was called "progressive" education. The goal of progressive education was to make classroom work relate as closely as possible to what was happening outside the classroom. Within a general framework, students were allowed to work more or less independently on one aspect of a goal or project. The emphasis of progressive education was life rather than a preparation for life.

Although this form of education may now be practiced in some day care centers and private schools, it is largely not practiced in public schools. Instead, little time is given over to individual experimentation or development. Most education is "standardized":

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[1]Martin Mayer, The Schools (New York: Harper and Brothers, 1961), p. 29.

Every student reads the same books, solves the same problems, and is categorized or placed in "grades" according more to age than to ability or accomplishment.

The Commission on Instructional Technology has taken a look at American education and has identified three basic problems.[2] First, education has been impeded by a lack of money and a lack of good teachers, administrators, and media specialists in the right places; therefore, the demand for education is far outrunning the resources necessary to supply that education. Second, the Commission found that education is unresponsive to the needs and interests of minorities, the disadvantaged, and individual students and out of touch with differences in the ways people learn, the speeds at which they learn, and the various motivations for learning. There is a need to individualize instruction, to form less-rigid "grades" and a more flexible organization and supply of resources for students. Finally, the Commission on Instructional Technology found education to be outmoded. Learning in schools is far behind the learning that goes on during day-to-day life. People are bombarded daily with communications from a variety of media--they have become "media conscious." But formal education makes only limited use of these many forms of communication. It is necessary to upgrade education by making it interesting and relevant to the world outside the classroom.

The Commission feels that these changes can come about in part

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[2]Commission on Instructional Technology, To Improve Learning (New York: R. R. Bowker Company, 1970).

by making use of the many means of communication available in society:

> Learning could be significantly improved if the technology and techniques of the . . . revolution of information could be harnessed to the tasks of schools and colleges.[3]

It is from this "revolution of information" that Instructional Technology was formed. As defined by the Commission, Instructional Technology takes two forms. It is the use of any medium--television, radio, film, or print--that can be used for instructional purposes. And Instructional Technology is a systematic approach to instruction, based on an understanding of learning and communication. Instructional Technology uses the tools of communication in combination with human resources to create more effective and efficient instruction.[4]

Although widely heralded as a means of improving education, Instructional Technology has had limited impact on instruction. Many of its problems stem from the ineffective, bits-and-pieces application of Instructional Technology. Teachers and school administrators do not understand instructional media; they have made use of the technology but not the technique. And because most ETV (Educational Television) is limited to broadcast television, and therefore subject to scheduling problems, it has often been merely an interruption in regular classroom activity rather than part of a planned instructional program.

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[3]C.I.T., To Improve Learning, p. 19.

[4]Ibid., p. 21.

Aside from isolated instances of successful applications, Instructional Technology over all does not fill 5 percent of the time American students spend in the classroom, and some experts put the figure closer to 1 percent or less.[5]

There are a number of reasons for this limited use of instructional media: resistance on the part of teachers, the high cost of equipment and training, lack of good programing and specialists familiar with the applications of media in education, and the resistance of parents and students.

Teacher resistance is a major obstacle to the use of television and other media in the classroom. Many instructors see television as a threat to their positions. They fear that, as automation has replaced workers on assembly lines, so television and other forms of instructional technology will replace them in the classroom. But a true "technology of instruction" depends on the combination of human and nonhuman resources. Teachers must come to understand that the media can be used to complement their instruction, not only to replace it.

Cost is another obstacle to implementing a "technology of instruction." Effective use of the media in education requires a large initial investment in equipment, as well as continuing funds for developing high-quality programs. There are also costs in terms of time to teach instructors effective use of the technology and the expense of employing media specialists to maintain the program and the equipment.

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[5]C.I.T., To Improve Learning, p. 23.

A separate, although related, problem is the scarcity of high-quality programing. On the local level, this scarcity is due in large part to limited funds, lack of teacher familiarity with the media, and a lack of specialists trained in the production of educational materials. On the national level, good programing is inaccessible because of red tape, copyright restrictions, and high cost.

Parents and students also resist instructional media. Parents are afraid that extensive use of instructional media will diminish student-teacher contact and fail to meet the needs of the nonaverage student, creating depersonalization, conformity, and standardization. Many students also complain of the lack of student-teacher contact; they cannot ask questions, and feedback is limited.

The future of Instructional Technology is not, however, all as bleak as these problems would seem to indicate. In the opinion of some experts, Instructional Technology can increase and enhance a student's opportunities for learning if applied properly, and it can involve both the teacher and the technology.

Instructional Technology properly applied can:

1. Make education more productive by speeding up the rate of learning and by relieving the teacher of administrative tasks, thereby freeing her to spend more time teaching.

2. Make education more individual through "programed learning" and learning centers, allowing more freedom and self-direction on the part of the student.

3. Give instruction a more scientific base, by understanding the processes of human learning and communication and the importance of reinforcement and reward.

4. Make instruction more powerful by introducing more

visual stimuli; rather than readings about the Civil War, parts of it can be re-created visually through television and film.

5. Make learning more immediate by bridging the gap between the world inside and outside the classroom.

6. Make access to education more equal and provide access to material and experts all over the world.[6]

However, before these benefits can be realized on a large scale, and before ETV can reach its full potential, an effective means of disseminating the information must be found.

There are basically four means of disseminating educational information via television: broadcast television, ITFS (Instructional Television Fixed Service), CCTV (closed-circuit television), and CATV (cable television).[7] The first of these is over-the-air broadcast channels. Most instructional programs are received in the classroom via VHF or UHF broadcasting channels. Fully 40 percent of PBS broadcasting hours are devoted to educational programing, most of it directed to the classroom,[8] and some commercial broadcast stations carry educational programing, usually early in the morning.

However, due to limited time on most broadcast television stations, ETV has run into problems of scheduling and program content. Because most educational programs on commercial stations are aired in the early morning hours, many adults have been unable to take advantage of the material. Similar problems have arisen in the formal classroom situation: Because the programing can only be

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[6]C.I.T., To Improve Learning, pp. 32-35.

[7]Polly Carpenter, Cable Television: Uses in Education (Santa Monica, Calif.: The Rand Corporation, May 1973), p. 6.

[8]Richard Adler and Walter S. Baer, Aspen Notebook: Cable and Continuing Education (New York: Praeger Publishers, 1973), p. 23.

made available at certain times, teachers must schedule class activity around the programs, often disrupting the formal structure of the class. And program content must be directed at a large audience, because only one program can be aired at a time. This may be fine for basic and introductory courses, but it is ineffective in reaching the special-interest audience.

A second method for delivering educational programing is via the ITFS stations, thirty-one channels in the 2,500-2,690 megahertz frequency range opened by the FCC for educational use.[9] The ITFS stations provide a point-to-point delivery service from a transmitter to one or more designated receivers. The signals are transmitted over the air, as in broadcasting, but special antennas and down-converters are necessary for signal reception. Only those buildings equipped with this special receiving equipment can make use of the signals. The cost of ITFS transmission equipment is approximately $18,000 per channel. The cost of the receiving antenna, down-converter, and power supply is approximately $1,800 per school.[10] The major drawback of the ITFS system is the high cost of the receiving equipment, which all but eliminates any applications in the home.

Closed-circuit television is the third system for delivering educational material. This method makes use of cable rather than air waves for delivery of programing. CCTV systems are usually limited to one building or a complex of buildings and therefore

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[9]National Education Association, Schools and Cable Television (Washington, D.C.: Division of Educational Technology, 1971), p. 40.

[10]Ibid., p. 31.

have almost no application for home-based instruction. However, within the school complex, CCTV systems are capable of providing a number of channels with the possibility for two-way communication and programs geared to individual needs and desires.

CATV, the fourth system for delivering educational programming, is similar to CCTV in that it also uses cable to carry the television signal to the receiver and functions as a "closed system." But unlike CCTV, cable television extends into the community, where its primary function is the improvement of broadcast reception. Cable offers many of the same advantages to educational programers as CCTV does: multiplicity of channels, two-way capability, and capacity to direct programing to specialized audiences. But because CATV exists within the community, it can provide the necessary link between the schools and the community that is essential to home-based instruction. Where ETV services are already in use, CATV can provide additional transmission of a greater variety of services at more times to schools for in-school programing and to locations in the community for adult education.

Each of these distribution systems has its own special capabilities, which could be combined to provide more services than they now can provide separately. Educational broadcast stations could serve the entire city; cable systems could reach the schools and other connected agencies; and neighborhood access to all television facilities could serve both homes and schools.[11]

Cable television and its unique capabilities have been investi-

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[11] Ibid., p. 10.

gated by a number of educators, media specialists, and governmental and educational organizations who perceive a need to expand ETV services within the schools and between the schools and the community. Out of their investigations have come a variety of general proposals for using CATV in education and long lists of more specific applications. For example, one researcher has outlined four general uses schools could make of CATV: instruction, in-service education, administrative communication, and community information.[12]

Cable television has the potential to solve many of the problems of broadcast delivery. Because cable has the capacity to dedicate one or several channels to specifically educational uses, a greater variety of programing (some of it directed to individual or small-group needs) can be offered and repeated at various times throughout the day. And by interconnecting all the educational institutions in a community with cable, resources that had been unique to one location could be shared by all.

This same interconnected system could serve needs beyond those of students. At the same time that students are receiving instruction via one television channel, teachers could receive in-service education on another to upgrade their skills.

Another channel (or the same one that is being used for in-service education) could be used to handle administrative matters. Rather than assemble teachers and administrators from throughout

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[12]Robert R. Suchy, CATV: Education's Pipeline or Pipedream? Document No. ED 061 712, Educational Resources Information Center (Washington, D.C.: U.S. Office of Education, 1972), p. 9.

a school district for a meeting, the matters could be discussed via cable interconnect between the various schools. In addition, all student and teacher records could be kept in one central computer bank, with each school linked to the computer by cable.

Finally, the community could be linked to the schools via cable. This link could be used to deliver information to home-bound students and for adult education. A cable network between a community and its educational institutions could go far toward improving the quality and diversity of information available to the students in the classrooms and the students at home.

> Resources such as course offerings and special speakers could be shared between institutions. In the area of adult education, for example, mini-campuses in branch libraries, store fronts, union halls, and churches could be linked via cable to a central educational cable-casting facility. Or those who have left the educational process because of age, ill health, or lack of interest or success and who are reluctant to attend an educational facility, might be induced to attend classes in the privacy of their homes. In short, cable television can obviate many space, transportation, and scheduling limitations of the present educational system.[13]

Such a cable system might lead to a decentralization of education, providing a more personalized system of learning. The home-based student, with access to more and better information, could set his own learning objectives, seek out the information necessary to accomplish those objectives, and gear his learning to suit his own needs, desires, and capabilities. Students could pursue their education in the form of an "independent study."

Perhaps the greatest social benefit CATV could offer

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[13] Cable Television in Detroit: A Study in Urban Communications (Detroit: The City of Detroit, 1972), pp. 7-8.

> would be to serve as an alternative to the institutionalized education system. By removing the educators and gatekeepers, the cable complex of the future might become more responsive to the learning needs of individual users rather than the dictated requirements of certifying agencies.[14]

Admittedly, the preceding two forecasts might seem a bit radical in their assessment of cable's impact on education. However, the potential is there. The impact it will have will be determined by the people who are in a position to influence CATV's development--educators, school administrators, media specialists, cable entrepreneurs, and franchising authorities.

A somewhat more down-to-earth view of cable's role in education was voiced by Joseph L. Stern in a speech before the 1972 meeting of the National Association of Educational Broadcasters. He suggested that less attention be given to "blue sky" services and more to such factors as "financing, design, and operational problems."[15]

Mr. Stern pointed out that there are actually two types of cable systems that educators must deal with. The first of these is the old system, typically carrying twelve channels with little, if any, channel space reserved for other than broadcast services. The typical expense for one of these old systems to expand its channel capacity is around $100,000 in plant costs plus the expense of set-top converters in every home.[16] Despite the expense, many of

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[14]Michael Molenda, "CATV and Access to Knowledge," Yale Review of Law and Social Action, Vol. 2, No. 3, Spring 1972, p. 249.

[15]Joseph L. Stern, Cable Television and Education. Document No. ED 070 265, Educational Resources Information Center (Washington, D.C.: U.S. Office of Education, 1972), p. 4.

[16]Ibid., p. 5.

these systems are being upgraded to provide additional channels and services.

Educators can make a number of uses of these additional channels, short of "blue sky," two-way applications. One of the more obvious of the immediate uses is simultaneous telecasting of ETV material, assuming that more than one channel is made available for educational purposes. With "scramblers," programs designed for specialized audiences, such as doctors, could be transmitted over cable with no fear of unwanted viewers receiving the information. And by using telephones with cable programing, a limited return signal capability can be achieved for such uses as polling or subscriber request and response services.[17] All of these services can be provided on a cable system designed for only one-way transmission if a channel is set aside for educational purposes.

The second type of CATV operation is the new twenty-channel system that under FCC regulations, must be built with at least two-way capability. Although these systems have the capability for two-way communication, there are technical and economic considerations that make two-way services unlikely in the near future. The primary technical problem is in reversing the classical "branched tree" distribution system.[18] Cable television is now operating with the signal originating at one location and traveling down the branches of coaxial cable to subscribers' homes. Two-way cable communications require that the CATV system be able to accept signals from thou-

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[17] Ibid., p. 7.

[18] Ibid., p. 8.

sands of originating locations and transmit them back over the cable net to a single location, or in more sophisticated systems, to several locations. Such operations are underway on some cable systems, and more are planned for the future, but they are all still in the experimental stage.[19]

Mr. Stern urges that:

> The social scientists and the educators have to look realistically at what those [two-way] systems can do, and at what cost. Analyze the cost benefits and the social benefits, in a manner not unlike the analysis that goes into creating a new university, a new teaching system, or building a new educational TV station.[20]

Meanwhile, educators would be wise to make use of the existing potential in CATV; one-way cable systems can be put to many uses.

In its 1972 Cable Television Report and Order, the Federal Communications Commission provided the foundation for educational access to cable television by dedicating one channel for "instructional programing and other educational purposes."[21] The channel was set aside for use by local educational authorities "without charge from the time subscriber service is inaugurated until five years after the completion of the cable system's basic trunk line."[22]

However, some educators saw the provision of a single channel

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[19] Ibid., p. 10.

[20] Ibid., p. 11.

[21] Federal Communications Commission, "Cable Television Report and Order," Federal Register, Vol. 37, No. 30, Part II, February 12, 1972, p. 3270.

[22] Ibid.

for educational use as "manifestly absurd."[23] Some educators hoped to protect the future of cable television in education by gaining a strong foothold in CATV development at an early stage. Although their goal was a noble one, these educators failed to realize that many of their demands went beyond the economic and technical capabilities of most cable operators. Nevertheless, a number of proposals for educational use of cable television have been developed that go far beyond the FCC provisions. In general, these proposals seek to allocate 20 percent of all cable channels to education, to require two-way capability on all CATV systems, to provide that a percentage of subscriber revenue be reinvested in educational programing, and to require free cable hook-ups to all public buildings and "at cost" internal wiring.[24]

Two-way communication is one of the most common demands educators make of cable operators. Although two-way communication will probably be a basic feature of most cable systems in the future, it is not a reality today. Purely experimental projects are being undertaken in various places throughout the United States, but they are just experimental. And interactive terminals are commercially available for home or school use, offering enough flexibility to handle nearly any educational application. However, these units still have a number of "bugs" in them, and the cost of the equipment

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[23]Fred T. Wilhelms, Cable TV; Protecting Its Future in Education. Document No. ED 056 481, Educational Resources Information Center (Washington, D.C.: U.S. Office of Education, 1971), p. 3.

[24]Typical of these proposals are: Jon Shafer, Education and Cable TV: A Guide to Franchising and Utilization. Document No. 071 432, Educational Resources Information Center (Washington, D.C.: U.S. Office of Education, 1973), p. 16, and NEA, Schools and Cable Television, pp. 2-4.

is still prohibitive.[25] A recent article in Broadcasting had this to say about two-way communication on CATV:

> Two-way uses of cable on a major scale remain at least 10 years away and will require substantial investments in terminal and software equipment.[26]

Even the cost to provide down-to-earth cable services such as free wiring of community schools could be prohibitive. The cost to provide "drops" to classrooms in a school building can be as much as $135 per room.[27] When the cost of providing a television for each drop is accounted for, the total costs can range from $200 to $300 for black and white to as high as $400 to ,500 for color, per room. The cost of wiring multiple classrooms throughout an entire school system may well be beyond the financial capability of either the cable operators or the educators.

Educators may be wise to reassess their demands in light of the fact that in the two years since the FCC established free educational access to CATV systems, very little use has been made of them. The FCC has spoken directly to this problem in the most recent clarification of the 1972 cable rules and regulations:

> Our educational access channel rules were designed to promote the use of that channel by educational authorities in the community. Much was claimed in the original dockets which led to the adoption of this rule about the potential for educational channels on cable. Little has developed. In retrospect, it appears that our limitation of one free educational access channel was wise. Designating vast channel capacity for education only to see

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[25]Shafer, A Guide to Franchising, p. 8.

[26]"Cable Has Something to Offer Education, But It's Some Time Off," Broadcasting, April 23, 1973, p. 31.

[27]Molenda, "CATV and Access to Knowledge," p. 247.

it lie fallow serves no purpose.[28]

The educators themselves admit that their record is a poor one. In a paper written for the Association for Supervision and Curriculum Development of the NEA, the author stated:

> The best weapon of franchise operators of bidders who don't want to provide much in the way of educational facilities is to argue that schools seldom do much anyway, even if the facilities are open to them. And they are right. [Emphasis mine.] Our record, as a whole, is pretty bad.[29]

Although this statement was made prior to the 1972 Cable Regulations establishing a free educational access channel, it is still largely true.

Nevertheless, there have been some very innovative and successful uses made of CATV by educators. One of these is the "Vincennes Project,"[30] in which Vincennes University, a two-year college in Indiana, secured franchises for three cable television systems. Although the systems have been used to deliver some educational programing, the major reason for operating the systems was to provide a profit for support of the school's ETV broadcast station. The project has been a success: The CATV systems generate enough profit to keep the entire operation, ETV and CATV, in the black.[31]

The cooperative programing effort of a CATV operator and local

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[28]Federal Communications Commission, "Cable Television: Clarification of Rules and Notice of Proposed Rulemaking," Federal Register, Vol. 39, No. 78, Part II, April 22, 1974, p. 14291.

[29]Wilhelms, CATV: Protecting Its Future, p. 7.

[30]Robert R. Stevens, "The Vincennes Project: A Study in ETV-CATV Relationships," Educational Television, July 1971, p. 12.

[31]Ibid.

educators in Grand Junction, Colorado, is another successful application of CATV in education.[32] In this case, both the CATV operator and the local educational authorities wanted to produce programing for use on the cable system, but they realized that a considerable investment would be necessary in order to establish the physical plant for high-quality programs. Therefore, the two interests combined their resources. To establish one good production facility rather than two inadequate ones, the CATV operator provided the studio, and the school district supplied $30,000 worth of equipment. The studio is partially staffed by broadcasting students from a local junior college, thereby providing the students with valuable production experience to supplement their classroom studies and economizing on production costs. Cooperation works: Production costs are maintained at an acceptable level, and both the CATV operator and the school system have access to a relatively sophisticated studio facility.

Oregon State University, in Corvallis, originates approximately forty hours per week of educational programing on a local CATV system.[33] In addition to receiving the course lectures via TV, the students are expected to attend one or two recitation classes per week and take conventional exams on campus. The cablecast classes are also offered on campus via CCTV, but it was discovered that approximately 60 percent of the students viewed the televised programs

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[32]NEA, Schools and CATV, p. 19.

[33]Leland L. Johnson, Cable Television and Higher Education: Two Contrasting Experiences (Santa Monica, Calif.: The Rand Corporation, September 1971), p. 17.

off-campus.[34] Extensive use of cable television has allowed O.S.U. to save on classroom space and faculty salaries. Of course, the extent of savings depends crucially on the size of classes that would be necessary without TV and the amount of time instructors spend in academic activities outside of class preparation.[35]

These three examples show that there are many uses for CATV in education in keeping with cable's current state of technology and the FCC regulations. In fact, a close look at the 1972 cable rules and regulations shows considerable leeway for the development of educational services on CATV. Although only one cable channel is initially allocated for each of the three access purposes, the regulations also provide for the expansion of channel capacity when existing channel use reaches a specific level.[36] This provision gives the cable operator six months in which to provide the expanded capacity, but this does not imply that the additional channel cannot be made available sooner. The time required to expand channel capacity will depend on the technical state of the CATV system and to a certain extent, the existing relationship between the CATV operator and the channel users. If the relationship is a good one, then the expansion will probably be made as quickly as possible. If the relationship is antagonistic, however, then the CATV operator may well take the full six months to comply. In most cases, a mutually beneficial working relationship will provide for an equitable solu-

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[34] Ibid.

[35] Ibid., p. 21.

[36] FCC, Federal Register, Vol. 30, No. 37, 1972, p. 3270.

tion to most problems, as in the case of Grand Junction, Colorado.

In addition to providing three access channels, cable operators must also provide "leased access channels."[37] This particular provision allows educators to lease channels in addition to the single dedicated channel. As in the case of channel expansion, the relationship between educators and the CATV operator will probably play a major part in determining the cost to lease an additional channel. As a rule, the CATV systems with greater than twelve-channel capacity are not making use of all their channels for broadcast and dedicated nonbroadcast purposes. Therefore, it should not be difficult for educational systems to negotiate an arrangement for leasing extra channels.

The FCC also requires that CATV systems in the top 100 TV markets build two-way communication capability into their systems.[38] Thus, when two-way technology has advanced to a level where operable terminals are available at a reasonable expense, interactive services can be instituted with minimum upgrading of CATV systems. Educators (and others) can thereby be assured that when the necessary technology reaches a practicable point, they will have access to two-way communication on cable television.

A moderate, realistic approach to the development of broadband communications services seems wisest, because certain technological and economic considerations make most of the "blue sky" projections impractical, if not impossible, for some years to come. However,

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[37] Ibid.

[38] Ibid.

there is a large range of applications for existing technology that can provide a foundation for more elaborate services in the future. But it is important to realize that if cable operators are overburdened with demands too early in the development of CATV, the future of cable communications may be hampered.

The FCC is attempting to avoid this prospect while protecting the interests of the public at large by insuring that broadband communications will be used to improve the quality of American life overall. These goals can only be accomplished through mutually beneficial cooperation among CATV owners and operators, educators, regulatory agencies, the public, and other concerned parties. Hopefully, a realistic approach to CATV today will assure that its promises for more elaborate services will be a reality tomorrow.

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